King County Road Maintenance Municipal NPDES Compliance Programs for 2004.

The Road Maintenance Section (KCRMS) of the King County Department of Transportation, Road Services Division is responsible for the maintenance of about 1900 miles of roadway system in unincorporated King County. Road maintenance activities occur within the "right-of-way" (ROW). ROW includes areas maintained by public agencies through prescriptive rights. ROW structures include planned, designed, engineered and constructed features that together encompass many built systems. Typical ROW structures include, but are not limited to, the following: Open drainage system/sediment transport system; closed drainage system/sediment transport system; retention/detention/wetland systems/sediment transport system; road surface/drainage and sediment transport system; bridge systems, utilities; and, the ROW itself, width, air space above and underground. This also includes other water bodies in the road right-of-way (ROW), and critical areas such as wetlands, slopes and stream streams. The RMS also supplies support, equipment and personnel for projects within other King County divisions and departments.

An understanding of the ROW, its structures, and its relationship to water quality and habitat is critical. Careful management of ongoing road maintenance activities, together with habitat restoration and water quality pollution prevention projects in or adjacent to the road ROW, and in King County facilities, substantially contribute to minimizing pollution of surface water, groundwater, and storm water in this region.

One of the most significant steps taken by the KCRMS to address the goals of the municipal National Pollutant Discharge Elimination System (NPDES) permit, has been the implementation of environmental Best Management Practices (BMPs) and the increased environmental awareness and monitoring of road maintenance programs in the road right-of-way and at KCRMS facilities. Enhanced erosion and sediment controls during daily operations and changes in road maintenance approaches have resulted in the reduction or reversal of adverse impacts of maintenance activities on water quality conditions. The programs that provide water quality protection and meet the NPDES intentions of clean water are described below.

ESA 4(d) Guidelines Program - KCRMS responded to the Endangered Species Act (ESA) listing of Puget Sound Chinook, Bull trout and other environmental regulations, such as the Clean Water Act and the King County Critical Areas Ordinance, by implementing a program that modifies roadway and roadside maintenance activities to avoid or minimize potential adverse impacts to fish species, and water quality. This program, known as the Regional Road Maintenance ESA Program, was developed in conjunction with about 35 other municipalities within Washington State, including cities, counties, and the Washington State Department of Transportation (WSDOT).

To assist local agencies in implementing the program, the Regional Road Maintenance ESA Guidelines (*Guidelines*) were written. The *Guidelines* were developed in

cooperation with the Services, United States Fish and Wildlife Service (USFWS) and National Oceanographic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries). NOAA Fisheries approved the Regional Program and issued a take limit under Section 4(d) of the ESA. NOAA Fisheries issued the Biological Opinion (BO) on August 15, 2003. The Regional Program consists of the following three parts:

- **Part 1: Regional Program Elements** is the basic framework for the Regional Road Maintenance ESA Program. It includes ten program elements that make up the Regional Program. Implementation of all ten of the program elements is required for a local agency to obtain a 4(d) take limit.

- **Part 2: Best Management Practices** is a set of site-specific best management practices (BMPs) for road maintenance. Under the Regional Program, road maintenance, environmental, and engineering design staff can use these BMPs, in addition to routine BMPs presented in Part 1 to achieve conservation outcomes identified in the *Guidelines*. It is recognized that state regulations and local ordinances or site-specific permit conditions may all dictate use of specific BMPs. For that reason, Part 2 offers a menu of possible BMPs from which the most suitable method of maintenance activity can be selected.

- **Part 3: Application** is an individual agency application for a 4(d) take limit under the Regional Program. The Part 3 Application, known as the "plug-and play" part of the Regional Program, allows local agencies to "plug" into Parts 1 and 2 of the program to receive a 4(d) take limit. The Part 3 Application is a specific commitment that an agency will comply with the ten program elements in Part 1.

There are ten program elements contained in the *Guidelines*. As proposed to the Services, an agency must implement all ten elements to receive approval. Each of the ten program elements has been implemented by KCRMS. The ten program elements are as follows:

Element 1. Regional Forum: A Regional Forum has been created from participating agencies. The Regional Forum provides a regional meeting for program discussion, coordination, and adaptive management.

Element 2. Program Review and Approval: The program review and approval process requires that each agency participating in the Regional Program comply with the ten program elements. The Washington State Department of Transportation (WSDOT) Highways and Local Programs (H&LP), Olympia Service Center, or Regional Forum will review each agency's Part 3 Application to whether or not it includes all program elements. To date, NOAA Fisheries has issued a take limit to 30 agencies.

Element 3. Training: Courses include the topics of basic ESA, design, biological review, permit activities, maintenance BMPs, and monitoring work activities. The

WSDOT Technology Transfer (T2) Center, in conjunction with the Regional Forum, has developed a curriculum that is taught by T2 instructors or other trainers. The Services has approved the training.

Element 4. Compliance Monitoring: Compliance monitoring takes place at several levels: local agency supervisory staff; local agency permitting authorities; and, state and federal permitting authorities evaluate BMPs for use and implementation. Each local agency has established a formal compliance-monitoring program, for monitoring BMP outcomes and for monitoring that is part of the various research projects.

To ensure full implementation of BMPs at all work sites, KCRMS hired a Site Development Specialist I to oversee the work of crews from and environmental perspective. The Site Development Specialist I works closely with the KCRMS environmental engineering staff, environmental scientists, and regulatory agencies to make sure that crews fully comply with environmental permit requirements. KCRMS's environmental staff works with engineering staff and regulatory agencies to assist crews in addressing practical difficulties that arise during the course of maintenance operations. Environmental staff from KCRMS is assigned to work sites in critical areas during specific phases of projects to monitor water quality and habitat impacts, ensure proper use of BMPs, and to conduct post construction monitoring of those sites.

Element 5. Scientific Research: Case studies in the field, as well as literature research done by others, are included in this program element. The scientific research element will serve to verify effectiveness of BMPs and update BMPs based on the latest technologies.

KCRMS staff has conducted BMP case studies. Experimental studies have been conducted since the beginning of this program to determine cost and effectiveness of various BMP applications. These studies have included use for recycled water from the wastewater treatment plant in Renton. Other studies have analyzed the effectiveness of various types of velocity-reduction and filtration BMPs when used in ditch maintenance operations, and studying the impacts of culvert replacements on stream water quality.

Element 6. Adaptive Management: The adaptive management philosophy is applied to all ten elements of the Regional Program. The training, research, biological data collection, and program monitoring elements are the basis for adaptive management.

Element 7. Emergency Response: This element provides the framework under which road maintenance organizations operate during emergencies.

KCRM must respond to natural and human caused emergencies. Emergency responses conducted during 2004 included landslides, spills, flooding, and other kinds of impacts. The level and effectiveness of the responses made by KCRMS successfully minimized the environmental impacts of theses emergencies.

Element 8. Biological Data Collection: This element includes habitat location information within the ROW and the development of a process to train and alert staff as to where the *Guidelines* need to be utilized.

Element 9. Biennial Reports: The Regional Forum provides biennial (every two years) reports to the Services. The Biennial Reports include a review of the ten program elements, updates on research, recommended BMP changes, and recommended updates on each program element.

Element 10. Best Management Practices (BMPs) and Conservation Outcomes: Under the Regional Program, BMPs and desired conservation outcomes have been developed for road maintenance activities. The Regional Forum annually reviews and updates the BMPs. Local agencies and the Services then reviews the changes the Regional Forum recommends for adoption.

In addition to the ten program elements included in the Guidelines, KCRMS has implemented the following environmental programs that benefit water quality.

Habitat Inventory and Assessment Program - There are over 500 miles of County roadway within sensitive areas including streams, wetlands, and lake buffers in unincorporated King County. There are thousands of cross culverts in the County roadway system. This program identifies areas that need habitat improvement projects and fish passage projects these projects are then prioritized, funded, and constructed.

To identify and evaluate potential future environmental related projects, KCRMS is an inventory and assessment of sensitive area habitats in the road right-of-way (ROW). There are four components to the inventory and habitat assessment; mapping, habitat evaluation, water quality assessment, and macro-invertebrate studies.

- **Mapping Program** - Under the County's Municipal NPDES Permit, KCRMS is required to inventory and map all stormwater conveyance systems, major outfalls, and related surface water data in the road right-of-way. To meet ESA inventory requirements, the NPDES mapping program includes locating and mapping all streams, wetlands, and stream crossing culverts within the road ROW. About 2,200 stream locations have been mapped.

  The NPDES field-mapping group used Global Positioning System (GPS) equipment to gather data locating and describing the existing drainage systems in the ROW of all unincorporated King County roads. The data was collected daily and incorporated into a Geographic Information Systems (GIS) map. Field crews reported anomalous conditions i.e. turbidity oil sheens, illicit hook ups, foul-smelling water and various other water quality concerns, as they encounter them, to the proper authorities.

- **Habitat Evaluation Program -** In addition to the mapping program, KCRMS conducted a detailed assessment of freshwater habitat areas in and adjacent to road ROW. This program is used to develop the scientific information necessary to aid in the management of new and ongoing road maintenance, and develop a

baseline of existing conditions. This program has identified additional sampling/evaluation needs; set drainage and ESA project priorities; justified joint projects with other agencies, landowners or other jurisdictions; and assessed impacts of future projects. This program is conducted, in part, to meet the ESA 4(d) program for biological data collection, and the Municipal NPDES requirement for the delineation of baseline conditions in stormwater dominated or impacted water.

The portion of this program evaluates the fish habitat in streams and ditches in the unincorporated King County maintained road ROW. This program conducts annual habitat surveys upstream and downstream from road crossings. As part of the assessment, the following factors were evaluated: sedimentation; streambed instability; loss of large woody debris; loss of pool habitat; blockage or passage problems; water quality degradation; and loss of side channel, off-channel habitats. Field crews report anomalous conditions i.e. turbidity, oil sheens, foul smelling water and various other water quality concerns, as they encounter them, to the proper authorities.

- **Water Quality Sampling Program** - The purpose of this program is to evaluate and monitor the water quality in selected streams and ditches in the unincorporated King County road ROW. This program, in coordination with the inventory and mapping, habitat evaluation, and macro-invertebrate collection programs, has helped identify additional sampling/evaluation needs; set drainage project priorities; justified joint projects with other agencies; and, has helped assess impacts of future projects. This program is conducted, in part, to meet the ESA 4(d) program biological data collection, and the Municipal NPDES requirement for delineation of baseline conditions in stormwater dominated or impacted water bodies.

  Water quality data are collected monthly, from approximately 120 sampling sites, for each year. Data is collected twice monthly, four times a year; during high and low flow months. The water quality parameters collected are dissolved oxygen (DO), turbidity, pH, and temperature using YSI multi-probes and discharge. The water quality parameters, noted above, are used to assess the water quality and the ability of the water body to support fish and other aquatic life**.** Other field observations were made on adjacent land use, upstream activities, road usage and drainage, and unusual conditions observed in the field. Field crews reported anomalous conditions i.e. oil sheens, turbidity, foul-smelling water, and various other water quality concerns, as they encounter them, to the proper authorities. A detailed water quality sampling plan was developed and includes water samples collected for laboratory analysis to compare to multi-probes readings.

- **Macro-Invertebrate Program** - To further assess the condition of habitat within the road ROW, KCRMS annually collects replicate samples of benthic macro-invertebrates at between 50 to 80 stream sites located in road ROW throughout unincorporated King County. This program is conducted, in part, to meet the

ESA 4(d) program biological data collection, and the Municipal NPDES requirement for delineation of baseline conditions in stormwater dominated or impacted water bodies.

Benthic macro-invertebrates are frequently used as environmental indicators of biological integrity because they are found in most aquatic habitats. They can be used to describe the water quality conditions or health of the ecosystem components and to identify causes or impaired conditions. Macro-invertebrate data collected is used to assess chronic habitat alteration, as well as the potential impacts of point and non-point pollution sources. The macro-invertebrate sampling stations were selected from existing KCRMS water quality monitoring stations. Field crews report anomalous conditions i.e. oil sheens, foul smelling water and various other water quality concerns, as they encounter them, to the proper authorities.

Fish Passage/Culvert Replacement Program - KCRMS crews carry out about 230 drainage projects annually. About one third of those projects involve stream crossings, or streams adjacent to ROW. Significant improvements to water quality, habitat and fish passage have been achieved through a shift in focus of this program. A process has been developed for rating potential habitat enhancement and fish passage projects based on environmental factors, as well as road maintenance priorities (such as safety, preservation of infrastructure, and reduction in maintenance costs). This program identifies and prioritizes projects that replace structures in the road ROW to improve habitat and passage through the water system. Changes in road crossing designs have improved habitat and water quality by allowing natural flow regimes in the ROW and through passages. These programs have reduced erosional events as well as create more natural habitats.

Programmatic Permits - KCRMS has focused on coordinating with federal, state, and local permitting agencies in developing programmatic permits. These permits reduce the cost and time in processing permits and, by implementing a programmatic approach, increase water quality protection. The increase in protection results from the consistency of implementation of BMPs and the increased monitoring of road maintenance activities within sensitive areas.

The Army Corps of Engineers (ACOE) near-shore fill and habitat enhancement programmatic permits have streamlined culvert replacement/fish passage projects. KCRMS has successfully negotiated two programmatic Hydraulic Project Approval (HPA) programs with Washington State Department of Fish and Wildlife (WDFW). One of the programmatic permits is for culvert maintenance projects in non fish-bearing streams in King County ROW and the other is for ditching projects in King County ROW.

Three programmatic permits with King County's permitting authority, Department of Development and Environmental Services (DDES) have been approved. These programmatic permits cover the following: maintenance work on the traveled roadway

surface; maintenance of open and enclosed drainage systems; and, work in the right of way. These permits result in increased training, reporting, monitoring, mitigation and management. The KCRMS environmental unit is tasked with the responsibility of assessing BMP effectiveness, and assessing the environmental performance of road maintenance activities.

Pit Site Compliance Program- KCRMS operates 25 sites known as road maintenance pit sites. The pit sites are operational headquarters, or mining/filling sites. The comprehensive pit site compliance program was begun in the early 1990's to bring all operating headquarters and mining/filling sites into compliance with environmental regulations. The pit site compliance program has involved installation of surface water treatment facilities, construction of equipment wash racks, paving and covering of material storage areas, and other measures to prevent pollutants from leaving the pit sites.

This program has provided support in the issuance process, public and agencies review and compliance of permits required for the pit site operations. These permits include State Environmental Act (SEPA), Clearing and Grading permits, Building permits, Surface Mining permits, Forest Practices permits, and city equivalent permits. This support has included collecting data needed for the permits, writing the permits, negotiating with agencies, conducting public forums, addressing compliance monitoring requirements and producing compliance monitoring reports as needed. The program has included the following elements:

- **Groundwater Monitoring Program** - This program collects groundwater samples from wells located at various pit sites for water quality analysis and to monitor the groundwater level in selected locations. This study investigates the impact of road maintenance activities on groundwater quality at selected King County pit sites. This sampling is conducted to provide data for reports to be written in support of the supplemental SEPA checklists currently being created which addresses the environmental impact of pit fill and mining activities.

  This program operates to provide information to meet King County stormwater manual design standards, and DDES permit design requirements. This support is required for design and compliance under King County Codes such as the water quality code, source control requirements, the stormwater codes and the grading code. The program supplies data that demonstrates that KCRMS pit fill, mining, and other pit site activities are meeting Washington State sediment management standards, groundwater standards and surface water standards. This program also addresses the Resource Conservation and Recovery Act (RCRA), the Model Toxics Control Act (MTCA), the Clean Water Act (CWA), Municipal NPDES requirements and the Solid Waste Handling Standards. The program fulfills compliance requirements for surface mining permits, clearing and grading permits, and other permits.

- **Pit Fill Sampling** - The intent of this program is to sample pit fill material for contaminant characterization analysis that provides data for environmental studies

of pit site activities. This program took soil samples from pit fill material (dirt from slides, ditch cleaning, and other maintenance activities) for laboratory analysis. This provides data for reports for supplemental SEPA checklist addressing the environmental impact of pit fill and mining activities. This program also addresses requirements found in RCRA, Municipal NPDES permit, MTCA, Solid Waste Handling Standards, SEPA, clearing and grading permits, and surface mining permits.

- **Industrial NPDES Sand & Gravel Permits** - Twenty of the KCRMS pit sites are permitted under the Industrial NPDES Sand & Gravel Permits sites. The five other pit sites do not need permits but are contained under the program requirements meeting General Industrial NPDES permit requirements. These permits require that the pit sites meet stormwater pollution prevention requirements. The program requirements have been met by the following actions:
  - Implementation of BMPs that prevent or minimize the potential pollution impacts to surface and groundwater from road maintenance activities. These include source control, operational, and treatment BMPs that prevent stormwater pollution.
  - Instituting a training program for KCRMS personnel in implementation of housekeeping, BMPs, proper materials handling, and spill response. This training includes maintenance standards for stormwater treatment facilities and operational procedures for each pit site.
  - Stormwater monitoring and reporting per permit requirements.
  - Stormwater pollution prevention plans (SWPPPs) implemented at pit sites, in compliance with the permit.

- **SPCC Program** -Spill Prevention, Control and Countermeasure (SPCC) Plans have been developed in response federal and state requirements due to the presence of fuel stations certain pit sites. This program includes spill response measures, training, and the access to pill response materials.

Coordinated Reduction of Waste - The Coordinated Reduction of Waste (CROW) program is a comprehensive construction waste-recycling program. Road maintenance and construction waste material, such as fill, asphalt, cement, street sweepings, and brush, are sorted, stored, and recycled. This program has replaced the past practice of dumping nearly all-waste materials at fill sites. This program protects the environmental resources and water quality by recycling materials to the greatest extent possible, diverting material from the landfill. The program promotes recycling, proper disposal, and storage of road construction debris, which reduces stormwater runoff from debris stockpiles and protects surface and groundwater from pollutants that could enter the systems.

The program has constructed a network of CROW pads at a number of the KCRMS maintenance sites and pits. A CROW pad consists of an asphalt pad with ecology block walls to temporarily store and separate out different waste materials. Runoff from these materials is diverted to a water quality treatment facility prior to infiltration.

Storm Drain Maintenance Program - The purpose of this program is to keep drainage systems functional and in good working condition. Storm drain maintenance activities include the removal of sediment from drainage features such as catch basins, storm drains, retention/detention ponds, etc. The treatment and disposal of these soils are addressed in the Vactor waste disposal program and the decant station program. These activities protect water quality by removing soils, oils, solid waste and other pollutants from the storm water conveyance system during cleaning of structures such as catch basins, pipes, and oil-water separators. Removing pollutants and soils from storm drain systems allows prevents these materials from discharging into regional surface water bodies. These activities also allow these structures to continue to function, removing soils and pollutants from stormwater rather than discharging downstream. These activities also identify trouble spots such as broken pipes, illegal discharges, spills, or areas with high sediment run-off.

- **Street sweeping Program** - Street sweeping removes dust and other debris from the roadway for dust and pollution control purposes. Soils and solid waste is collected before it reaches storm drain systems or streams. This prevents water quality degradation by the removal of these materials before soils and solid waste have an impact on water quality. Sand from snow and ice operations, and leaves, are significant material sources that are removed. Sweeper trucks collect sweepings and transport them to appropriate treatment or disposal facilities. The resulting soils and solid waste are managed by the Vactor waste disposal program and the decant station program.

- **Catch Basin Program -**Enclosed drainage systems in the roadway are cleaned frequently to ensure that the systems remain functional, and to prevent soils and pollutants from entering the surface water bodies and groundwater. Enclosed drainage systems and catch basins are cleaned using a vacuum flush truck, which is used to remove both solids (soils and solid waste) and liquids from drainage catch basins and pipes. The resulting liquids and solids are managed by the Vactor waste disposal program and the decant station program.

- **Vactor Waste Disposal Program/Decant Station Program** - This program was created in response to the Municipal NPDES requirements to meet the CWA. Liquids vactored out of catch basins, and from other like operations, cannot be re-introduced into the surface waters of Washington State and must be disposed into a wastewater stream at a decant station. KCRMS has been responsible for the development and operation of a countywide regional vactor waste disposal program, which involves operation of decant stations throughout the County. King County, other governmental agencies, and private vendors use these stations to properly dispose of vactor liquids, vactor solids, and sweepings. The regional vactor waste disposal program is providing an environmentally sound system for disposing of waste generated from the cleaning of stormwater drainage systems.

  King County provides vactor decant stations open to the county, private vactor companies, and other public agencies. This program promotes the treatment and

recycling of the solid material through bioremediation, or by vendor disposal to reduce contaminant levels below regulatory requirements. The stations provide pre-treatment to decanted liquids, prior to discharging to sanitary sewer. The program promotes the protection of water quality by providing proper disposal options for materials generated from the maintenance of stormwater drainage systems.

There is a special incident load policy in place, associated with this program. This policy activates when King County vactor trucks or sweepers contain water and/or solids that are identified as containing contaminants that should not be put into the decant station without testing. These materials are placed in special holding tanks, tested, and appropriately disposed of, based on the test results.

- **Street Waste Monitoring Program** - Solids and liquids generated from sweepings, vactor operations, and pit fill operations are regularly sampled and the results are reviewed for potential contaminants. This program ensures that the materials are disposed of, or reused appropriately. Sampling liquids at the decant stations are required for discharge to sewer. Solids from sweeping and vactoring, and other maintenance operations are tested, classified appropriately, and then processed, recycled, or appropriately disposed of under dangerous or hazardous waste requirements.

Underground Storage Tank Removal/Monitoring Program - This program has removed, replaced or upgraded all King County fuel station underground storage tanks (USTs) at road maintenance facilities. This program included the installation of spill prevention protection and leak detection at the new fuel stations to meet new standards. The program found that a number of sites had leaking underground storage tanks (LUSTs) and these sites became part of the Model Toxics Control Act (MTCA) Voluntary Cleanup Program. The sites were remediated, including the removal and disposal of contaminated soils and long-term groundwater monitoring is conducted at these sites. The upgrades of the fueling facilities offers better protection against spills, and any leaks have less opportunity for soil and groundwater contamination.

This program responds to discoveries of USTs in the road ROW and at sites owned or previously owned by the county. This program conducts the excavation, removal, and disposal of the USTs and their contents; the excavation, testing and disposal of contaminated soils; and, the testing of the surrounding soils and groundwater for contamination. These sites are included under the MTCA Voluntary Cleanup Program and long-term groundwater monitoring is performed.

An experimental program is being conducted at one site to determine the effectiveness of *in-situ* treatment of contaminated soils using bioremediation. Oxygen Release Compounds (ORCs) have been introduced to gasoline contaminated site with oxygen-poor groundwater. This program has resulted the gradual decrease of Benzene, Ethylene, Toluene and Xylenes (BETX) concentrations and concentrations of gasoline-ranged compounds, which may be attributable to increased levels of microbial activity.

Hazardous Materials/ Spill Response Program - KCRMS has had an extensive program addressing hazardous and dangerous materials. The are multiple programs that address spills and response procedures:

- The Regional Road Maintenance ESA Program Guidelines, Emergency Response element, addresses events such as landslides, spills and flooding.
- The Habitat Inventory and Assessment Program has field crews report anomalous conditions i.e. oil sheens, foul smelling water and various other water quality concerns, as they are encountered.
- Pit Site Compliance Program has a spill response program for spills that occur at pit sites and has Spill Prevention, Control and Countermeasure (SPCC) Plans for pit sites with fuel stations.
- Vactor Waste Disposal Program/Decant Station Program has the special incident load policy addressing potential contaminants found in liquids and solids.

In addition to the programs listed above, King County Road Maintenance also has the Hazardous Materials/Spill Response Program. This program addresses the handling of abandoned waste containers, spills, and other miscellaneous hazardous materials found in the road ROW by KCRMS staff. This program has safe, standard methods for the KCRMS staff to deal with potential hazardous waste encountered in the road ROW. This program inspects, categorizes, contains, and transports potentially hazardous waste from the field to one of the ten hazardous waste storage facilities operated by KCRMS. This program has been closely coordinated with Washington State Department of Ecology Spill Response Team.

One element of this program, which has increased radically over time, has been the discovery and disposal of dumped or abandoned meth-amphetamine laboratories and the associated paraphernalia.

Pollution Prevention Program - KCRMS is required to track and report all the waste created to Washington State Department of Ecology in the Annual Hazardous Waste Report, a requirement of the Dangerous Waste Regulation Chapter 173-303 WAC. The Pollution Prevention Program is conducted to reduce KCRMS generated hazardous waste products. Generated hazardous waste is waste product from job activities performed by KCRMS. This program improves the practices for reducing and tracking the amount of waste generated by KCRMS activities. The program includes staff training in proper waste prevention practices and tracking procedures, which reduce the amount of waste created.